

WHAT IS A VENOUS LEG ULCER

Venous leg ulcers can be chronic, painful conditions, so it is vital for healthcare professionals to understand the anatomy of the lower leg, the aetiology of various problems associated with low venous return and recognise underlying conditions in order to manage ulcers more effectively.

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Figure 1. A venous leg ulcer.

A leg ulcer is often defined as a break in the skin on the lower leg that takes more than 4–6 weeks to heal (Scottish Intercollegiate Guideline Network [SIGN], 1998) (Figure 1). However, this does not explain what an ulcer is and does not make it clear that there is an underlying condition causing the ulcer. It is important for healthcare professionals and patients to understand the cause of the ulcers so that they are able to treat them effectively. With an understanding of the condition patients may be more likely to comply with treatment regimens and have a more productive relationship with the people helping to manage their care.

The aim of this article is to explain how venous leg ulcers develop and to link this information to what can be seen on the lower leg and what the patient might experience, and to connect these signs and symptoms to the management of the ulcer.

Venous leg ulcers are the most common type of leg ulcer (about 70% are venous) and about 100,000 people in the UK have a leg ulcer (Briggs and Closs, 2003). Although it is mainly older people who are affected, it is important to remember that people of any age can develop a venous leg ulcer (Kantor and Margolis, 2007).

Major problems associated with leg ulcers are pain, loss of mobility

and the effects that having an ulcer (or ulcers) can have on the way people manage their daily lives. This can lead to significant financial implications as people may be unable to work, or if they are working, have serious difficulties when trying to balance their work lives with appointments for investigations and treatment of their ulcer. Ulcers can take many weeks or months to heal, and a huge commitment is needed on the part of the person with the ulcer. It is important that healthcare professionals recognise the condition, carry out the appropriate investigations and begin treatment as soon as possible. Too often patients are found to have had their wound for weeks (or longer) before proper

treatment is started. It is for this reason that all healthcare providers should be aware of what causes an ulcer and how the underlying condition can be managed.

Many primary care trusts have a leg ulcer service, which ideally should be supervised by a specialist leg ulcer nurse. Referral criteria varies but all healthcare professionals should know what is available and who to contact for advice. Practice nurses may face particular challenges, as they may have limited access to support and education about the condition and be severely constrained by inadequate appointment times for patients with leg ulcers (Knight, 2008).

Leg ulcers can be expensive conditions to manage. It is in everyone's interest to deliver the best treatment to heal the ulcer as quickly as possible, and manage the condition to reduce the risk of it occurring again. There can be challenges in nursing home environments where appropriate expertise may not be readily available. This should not be an excuse for doing nothing or delaying treatment. Many sources of education and support are available for healthcare workers, but to access the most appropriate level of education and training it is necessary to understand the condition and know what skills are required to manage it.

Anatomy and physiology

The underlying cause of a venous leg ulcer is venous disease. Venous disease happens when veins are not working properly. It is a condition common to many

adults (and some younger people) which builds up over many months and years. Not everyone with vein problems will go on to have a leg ulcer, but everyone with a venous leg ulcer will have signs and symptoms of venous disease that they can trace back over time (Royal College of Nursing [RCN], 2006). If nurses are able to recognise these signs and symptoms early, people can be encouraged to look after their legs and help to prevent ulcers from occurring.

The veins

Arteries take blood containing oxygen to all parts of the body. The veins join up with the arteries and take the blood back to the heart when all the oxygen has been used up so that it can be resupplied with oxygen. The pumping of the heart and gravity makes arterial blood flow. The veins rely on the action of muscles to pump the blood back to the heart (and on respiration as we breathe in). As blood in the veins is flowing towards the heart, it does not generally have gravity to help with flow, especially in the legs, so the action of muscles is important. The key muscle in the lower leg is the calf muscle. The calf muscle pushes the blood along but if the muscle relaxed, the blood would just flow back down the leg vein again. Thus, the veins contain many valves which only allow flow in one direction. As the blood is pumped along, the valves close to stop the blood from flowing backwards (Waugh and Grant, 2001).

Calf muscle pump

If you put your hand on your calf you should be able to feel the muscle as a rounded structure.

When you flex your ankle the shape of the calf muscle changes, becoming wider and flatter. Veins are encased in this muscle and when the muscle becomes flatter it pushes on the veins squeezing the blood up the vein. The valves in the vein open to allow the blood through and then close when the muscle relaxes to stop the blood flowing back down the leg again. This means this section of the vein is empty. As the calf muscle moves again, more blood is pushed along to fill up the empty section of the vein (Tortora and Grabowski, 2000). This is a normal, continuous cycle which keeps venous blood moving. There is also a pump in the foot which helps push the blood upwards which is squeezed each time weight is put on the foot. The size of the calf muscle does not necessarily give an indication as to how strong it is. A normal lower leg shape has an ankle circumference smaller than the calf circumference; this is called a graduated shape. Some people have a similar circumference at the ankle and calf, indicating that the muscle may not be as well developed and, therefore, unable to squeeze the veins well. Flexing the ankle and foot makes the muscle change shape and if the ankle joint is fixed it is not easy to change the shape of the calf so there will be a limited squeeze on the veins. It is important to look at the shape of the leg and to watch the person walk to see how flexible the ankle is, and what the effect on the calf muscle might be (Anderson, 2008).

What goes wrong with the veins?

The two key things that affect

the blood flow in the veins are the calf muscle pump and the valves. If something happens to the valves and they are unable to close properly, blood will be allowed to flow backwards down the veins. The valves can stop working for two main reasons. First, they may be damaged by surgery or accidental damage such as a fracture or a blood clot in the vein (deep vein thrombosis [DVT]), or by anything that cuts into the veins. Subsequently, as the valves are either damaged or cannot close properly, they allow backflow of blood. This means that there is extra blood in the vein, which stretches its walls and pushes the valves further apart allowing more blood to flow backwards, thereby worsening the situation.

Stretched veins

When there is extra blood in the veins due to backflow, the vein walls stretch from the pressure. This is called venous hypertension. If the problem is not treated it becomes chronic venous hypertension (also known as chronic venous insufficiency [CVI]), as the blood flow is not working efficiently. The stretched veins will be visible and may cause some discomfort. The stretching means that some red blood cells and fluid (plasma) can leak out of the vein into the tissues under the skin.

Stretched veins: visible signs

Stretched veins are visible under the skin as spider veins or ankle flare — little broken veins most often seen around the inner ankle area. As the venous hypertension continues the veins become stretched and damaged by the pressure and are seen (and felt)

as varicose veins. Many people have varicose veins but do not go on to have a leg ulcer. However, their risk is increased because their veins are damaged and so they should be encouraged to look after their legs to reduce the venous hypertension.

Fluid leakage

Fluid normally leaks out of the veins and flows back into the veins from the tissues. This helps to keep everything in balance. Standing up for a long time can make the ankles swell, which recedes when resting. This is a normal body balance. When the veins are stretched because they are too full, the fluid cannot flow from the tissues into the veins because there is no room, so it stays in the tissues. This is visible as swelling around the ankles (oedema). As this situation worsens the whole leg can become swollen. In the early stages if you press the skin gently with your finger, the area of skin will be indented and will gradually fill out again (pitting oedema). If the ankles are elevated above the level of the hips, the swelling reduces as gravity helps the blood flow back to the heart, reducing the congestion in the veins. However, if nothing is done, the tissues will harden, the pitting will not occur and elevation of the ankles will not help. This condition is called chronic oedema.

Legs which are swollen and waterlogged will be particularly fragile and liable to become damaged (Hedger, 2008). There is also a risk of infection if the skin becomes damaged (Eagle, 2007).

Red cell leakage

Red cells leak out of stretched veins. The body's natural

processes break down the cells, which means the red pigment in the cells is left sitting in the tissues. It causes a stain on the tissues that can be seen through the skin and is called haemosiderin staining or hyperpigmentation. The staining can be different shades depending on the skin colour, but is always darker than the original skin colour and will be permanent.

Effects of inefficient venous blood flow on the skin

As a result of congestion in the veins, leakage of cells into the tissue and a loss of the balance of cells and fluid between blood vessels and the tissues, the skin begins to suffer. This is visible as dry, flaky skin and can become quite severe with layers and layers of dry skin building up — a condition called hyperkeratosis. The skin can become increasingly sensitive and eczema can occur leading to red, weeping, itchy and very sensitive skin (Cameron, 2007). Scratching and trauma can lead to infection and increased pain. As skin changes develop, the undernourished and congested tissue changes. The fat hardens and loses its elasticity, the skin loses its 'give' and feels hard to the touch. Altogether, the hardness, skin colour changes and dry skin is a condition called lipodermatosclerosis and often the changes in the leg include a change in shape where the calf area enlarges and hardens. This is commonly called an 'inverted champagne bottle' shape.

Visible signs of venous disease

Looking at the leg and the mobility of the patient gives nurses many clues about the

presence of venous disease. Ankle flare and varicose veins tell us that the veins are being stretched. Changes in the colour of the skin demonstrate that red cells are leaking from stretched veins. Ankle oedema, especially if the person has been standing or sitting for a while, tells us that the veins are stretching and leaking fluid. Changes in the skin condition and shape of the lower leg indicate that the tissues are undernourished due to congestion in the veins, which slows the normal flow of blood back to the heart.

The ulcer

The blood flow in those with venous disease is insufficient to nourish the tissues which are affected by poor quality skin and excess fluid in the tissues. Any damage to the skin in these circumstances leads to a wound; in this case, a venous leg ulcer that will be difficult to heal unless the underlying problem (venous disease) is treated. A wound to the leg would be expected to heal within a relatively short period of time, especially if there were no complications such as infection or other diseases present. A very large wound would take longer than a small one to heal, but would nevertheless progress to healing relative to its original size. However, if there is an underlying condition such as venous disease, the wound would be trying to heal while inefficient blood flow, leaking cells and fluid and skin changes was present, which would clearly cause difficulties. It is for this reason that the condition has to be treated at the same time as the wound is managed. If the condition is not managed, the wound may

heal eventually, but will rapidly break down again because the underlying problem remains (Anderson, 2006).

What is it like to have a venous leg ulcer?

Many people have signs of venous disease such as ankle flare and varicose veins. For some this is a minor inconvenience and perhaps presents some aesthetic issues. For others, varicose veins can be painful, especially if sitting or standing still for long periods of time. Swelling of the ankle can be uncomfortable and can interfere with movement of the ankle joint. Swelling which limits movement will have an effect on how effective the calf muscle pump is, as this muscle needs ankle movement to make the muscle change shape. Swollen legs can be extremely heavy, making walking and everyday actions, such as rising from a chair or getting into bed, difficult to do. Dry skin and more significant skin problems such as eczema can feel hot and legs can be heavy, itchy and painful for days, weeks and months, which will affect daily tasks and how the patient feels about themselves and their experience of living (Brown, 2005). Add in an ulcer, which is perhaps painful, may leak and damage the patient's skin and possibly smells unpleasant, and you can begin to imagine the experience of those living with venous ulcers.

What investigations need to be done before treatment?

All of the above signs and symptoms are strong clues that venous disease is present and may be the reason for the ulcer. There needs to be a lot

more information gathered as part of the patient assessment, including past medical history and family history. The RCN guidelines (2006) are particularly helpful about the type of information required and serve to illustrate why short appointment times are insufficient for the assessment and management of people with leg ulceration. Bodies are complex and there is the possibility that other conditions exist at the same time as venous disease.

The main treatment for venous disease is compression therapy, which squeezes the veins to make the blood flow faster. When the veins are squeezed, so are the arteries which bring oxygen to the tissues. Tissues without oxygen will die. If the arteries are partially blocked there will be less oxygen in them, and even less oxygen if they are squeezed. Normally, squeezing arteries would not be a problem, but if there is a partial blockage this could be serious for the patient. Doppler assessment should be done to make sure there is not a problem with the arteries before the venous disease is treated with compression therapy (Worboys, 2006). Doppler assessment uses a hand-held ultrasound device to measure the blood pressure in the arm and at the ankle. These pressures are compared in a calculation called the ankle brachial pressure index (ABPI) to find out if the flow of blood in the arteries is the same at the heart level as at the ankle. If they are not similar there may be a problem with the arterial blood flow to the lower leg (Worboys, 2006). As well as the Doppler, a whole patient

assessment needs to be carried out and documented. The healthcare professional doing this assessment has to be sufficiently knowledgeable and trained and will be accountable for the assessment and management decisions taken.

What can be done to reduce the effects of chronic venous hypertension?

By recognising the signs and symptoms of venous hypertension steps can be taken to reduce the risks of ulceration. Key aspects of management are:

- ▶ Exercise to maintain ankle mobility and the effectiveness of the calf muscle pump
- ▶ Elevation of the ankles above the hip when sitting to allow gravity to help speed up the blood flow to reduce congestion in the veins
- ▶ Compression therapy to help the valves to close so that the venous flow is more efficient.

Squeezing the veins with compression bandages or hosiery speeds up the blood flow and reduces venous hypertension. This means that the flow is more efficient:

- ▶ Fluid flows from the tissues into the veins reducing oedema
- ▶ The tissues are better nourished so dry skin and hardness improves
- ▶ The reduction in pain and discomfort allows the person to become more mobile and feel better.

Conclusion

This introduction to venous leg ulcer development allows the inexperienced practitioner and patients to understand the changes which occur in

the lower leg, and to make the link between treatment and management. As ever, the reality is more complicated and there is much still to be discovered. In the meantime, a working knowledge of the underlying processes and empathy for people with this disease can help to build partnerships that can be crucial for effective management.

National guidelines (RCN, 2006; SIGN, 1998; Clinical Resource Efficiency Support Team [CREST], 1998) and resources such as the patient leaflet series developed by the Leg Ulcer Forum (www.legulcerforum.org) and previous issues of *Wound Essentials* (www.wounds-uk.com) are useful sources of information about the condition, assessment techniques and treatment for leg ulcers. **WE**

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Key points

- ▶ Balancing work life with leg ulcer management can be difficult for many patients.
- ▶ Leg ulcer management must not be delayed.
- ▶ Swelling in the leg will limit the action of the calf muscle pump.
- ▶ Patient assessment is compulsory before starting compression therapy.
- ▶ Understanding venous disease can help patients and practitioners work together to manage venous ulcers.

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